

Universal Orbital Material Processing Module, Phase I

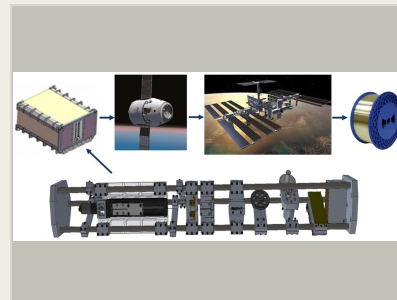
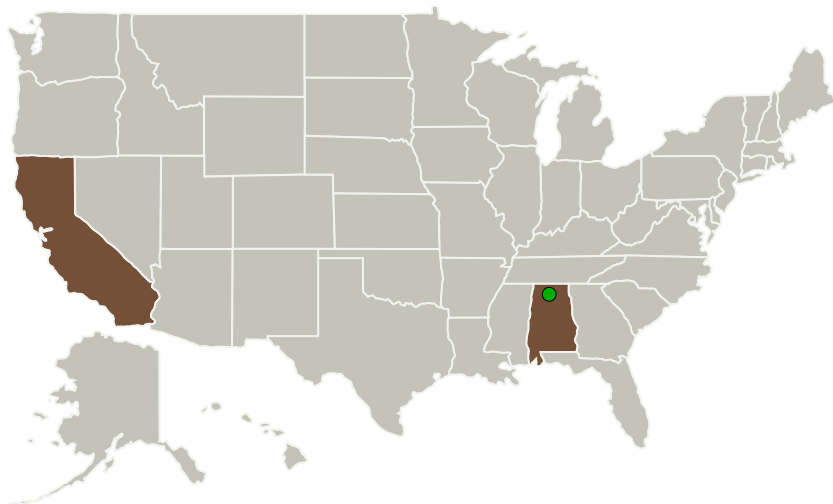
Completed Technology Project (2014 - 2014)



Project Introduction

To address NASA need for sustainable space operations and full utilization of the International Space Station (ISS) and specifically to advance the "Materials, Structures, Mechanical Systems and Manufacturing" Physical Optics Corporation (POC) proposes to develop a new Universal Orbital Material Processing Module (UniMatPro), an orbital scientific payload that will be capable of optical fiber draw on board ISS. The specific product of this development is "ZBLAN", an optical fiber based on a fluoride glass composition. Due to its unique transmission from ultraviolet to midwave infrared, ZBLAN has immediate applications ranging from medical fiber lasers to military airplane countermeasures. ZBLAN glass and glass fibers, when produced on Earth, exhibit excessive insertion loss due to crystallization; however, this crystallization can be suppressed in zero gravity. Low down-mass and the high value of low-loss ZBLAN fiber make it an ideal candidate for commercial ISS utilization. In Phase I POC will design the processing unit for ZBLAN fiber manufacturing on the ISS based on a novel draw process without recoating. We will demonstrate the feasibility of battery-powered wireless operation for a TRL-4 prototype, achieving TRL 6-8 by the end of Phase II, followed by an opportunity to expand the UniMatPro module utilization for processing other prospective materials.

Primary U.S. Work Locations and Key Partners



Universal Orbital Material Processing Module Project Image

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Organizations Performing Work	Role	Type	Location
Physical Optics Corporation	Lead Organization	Industry	Torrance, California
● Marshall Space Flight Center (MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	California

Project Transitions

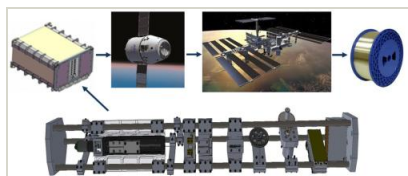
▶ **June 2014:** Project Start

✓ **December 2014:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137785>)

Images



Project Image

Universal Orbital Material Processing Module Project Image (<https://techport.nasa.gov/image/129219>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Physical Optics Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

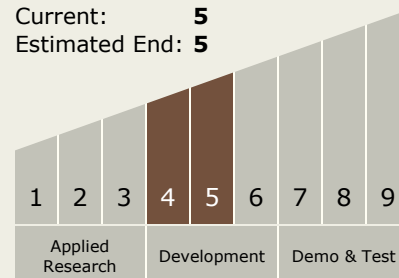
Carlos Torrez

Principal Investigator:

Kenneth Levin

Technology Maturity (TRL)

Start: 4
Current: 5
Estimated End: 5



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.4 Manufacturing
 - └ TX12.4.1 Manufacturing Processes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System